The EXCAVATING ENGINEER

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With the T. J. Foley Company of Pittsburgh, Pa.

Describing a Number of the Contracts Handled by the Foley Organization. These Are Mainly Railroad Jobs, Including Grade Replacement Work, Ballasting, Yard Work and the Building of New Lines.

THE Foley Company is not an old company, but it is one of the most progressive contracting corporations in the East. They maintain offices at Pittsburgh, Pennsylvania, and Philadelphia, and from here their many contracts are directed, whether the job be in Ohio, West Virginia, Pennsylvania, New York or elsewhere.

The officers of the company are all young men, consisting of T. J. Foley, President; A. E. Foley, Secretary; W. M. Watson, Treasurer; and J. F. Kunz, Chief Engineer and General Superintendent.

A large percentage of the contracts handled are railroad jobs, including yard work, track elevation and grading for new lines. The Foley Company believes in going out after a job, pushing it hard, and getting things done in a hurry and done well. This is greatly responsible for the fact that most all the contracts are big ones, and undoubtedly responsible for the enviable reputation they have today.

There is here described a number of contracts handled by the Company, some of them big jobs, some small, a number of them worked at the same time. There is a storage yard for the Pennsylvania Railroad at Massillon, Ohio; The Bucknell University Stadium; a bridge at Camden, New Jersey; a sixteen-span bridge at Chester, Pennsylvania; classification yards at Altoona, Pennsylvania; warehouse and filtration and water softening plant at Pittsburgh, Pennsylvania; large yards at Weirton, West Virginia; additional main line tracks at Hollidays Cove, West Virginia; additional main line tracks at Broadacre, Ohio. This array of work gives some idea as to the magnitude and capability of the organization.

T. J. Foley, President of the Company.

Storage Yard at Massillon, Ohio

The job at Massillon, Ohio, included grading and track laying, and 600 feet of 8 feet x 8 feet reinforced concrete culvert. As the job was finished, the area of the yard came up to 200,000 square feet. The need for this extension of yard facilities for classification and storage was created by improvements made by the Central Steel Com-

pany, which included a 700-ton blast furnace and additional strip mills.

The contract was let to the Foley Company by the Pennsylvania Railroad on June 1, 1926. Work was actually started on June 5, 1926, only four days after the contract was let. The entire job involved about 120,000 cubic yards of excavation, the material consisting of sand and gravel in a well-compacted formation.

The 8 feet x 8 feet reinforced concrete culvert which was required by a creek change was built first in order that they might go ahead with the fill and lay the track over that part. The culvert was laid diagonally across the yard. The excavation necessary amounted to about 4500 cubic yards, 1000 cubic yards of which was used for backfill over the culvert, and the remaining 3500 cubic yards was wasted at the site. This excavating was handled by a Brown-Hoist crane. About 20 feet of culvert was laid per day. When the excavation was finished the crane was put to work unloading sand and gravel. Alpha Portland Cement was used in building the culvert. About three feet of ballast was placed over the finished culvert.

Looking Out Over the Partly Completed Approach to a Concrete Viaduct Built by the Foley Organization at Marcus Hook, Pennsylvania.

The grading work for the yard was completed in fifty-five working days, a splendid record, coming as a result of the policy of the Foley Company in exerting every bit of effort possible to finish a job rapidly and well. The completed excavation was made in one lift, making cuts that were approximately 28 feet wide, from 18 to 25 feet deep and 800 feet long. The digging was handled by a Marion railroad-type shovel, and the haulage was handled by eight 30-cubic-yard Koppel air dump cars, hauled by two 50-ton American locomotives.

The 1¼-yard Shovel Coming on to the Job at Hollidays Cove, West Virginia.

Of the 120,000 cubic yards excavated, 85,000 cubic yards were placed on a trestle at the property of the Central Steel Company, 10,000 cubic yards on a trestle at the property of the Pennsylvania Railroad, and 10,000 cubic yards were used for fill at the site. This fill was laid to an average depth of eight feet, amounting to about 40,000 square feet.

Bucknell University Stadium

Mr. Foley is a graduate of Bucknell University, and it was in the year of 1924 that he built their stadium. Although this job has been finished for some time, it is of particular interest to the field of excavation and building because of the handicaps under which the Foley organization worked. There was involved in this work, 135,000 cubic yards of excavation and 7000 cubic yards of concrete. After the stadium was finished and dedicated ready for use, the Bucknell University official publication printed this little write-up concerning the builder.

"Thomas J. Foley will go down in history not only as the builder of the Bucknell Stadium but also as a contractor who gets his jobs done on time. Never did any contractor on any job face more exasperating difficulties. When work was started March 17th, Foley had exactly seven months and one day in which to make good his agreement to have the Stadium finished for the Lafayette Game, October 18th. In a time so short, it did not seem possible that such a mountain of earth could be

moved, and so huge a structure erected with rain falling continually, week after week, completely tying up the work for more than seventy days. No one believed the stadium could possibly be finished on time. Its completion is a wonderful achievement, and a mark which many will try to emulate but few will attain."

Additional Main Line Tracks at Hollidays Cove, West Virginia

This job involved the laying of an entirely new section of main line track extending from Weiten Junction to Collier, West Virginia. About 12,000 feet of track was laid here. The contract was let on June 15, 1926, and work was actually started on June 30th.

The shovel work on this contract involved about 150,000 cubic yards of excavation, 50,000 cubic yards of which was solid limestone, 70,000 cubic yards shale, and 30,000 cubic yards stiff clay. The excavation was divided mainly into three cuts. Cut No. 1, a creek change, required the moving of 50,000 cubic yards of material. Cut No. 2 was a road change, and required the moving of about 30,000 cubic yards of material. Cut No. 3 was a widening job to make room for additional track and required 60,000 cubic yards of excavation. There was also a small creek change cut which required the moving of about 10,000 cubic yards of material.

The digging equipment on this job consisted of a Bucyrus 41-B 1¼-yard steam shovel, and a ¾-

The New Machine Digging Its Way Down Into the Stream Which It Had to Cross.

yard Erie. The Bucyrus machine handled Cuts No. 1 and 2 and the Erie machine handled Cut No. 3. The 1¼-yard machine handled the smaller creek change work as it came onto the job. It was unloaded at Hollidays Cove, and moved approximately one mile over country road, up a 15% grade and down an 18% grade, then into the creek, where it worked in about three feet of water on a soft bottom and handled about 500 feet of creek change.

Cut No. 1 of the main excavation was handled in three lifts, and was 500 feet long, 35 feet wide and 70 feet deep. This cut was through the remains of a previous fill made when the railroad was built, and required careful handling, as the limestone had all been shattered and was full of seams.

Cut No. 2 was 1500 feet long, 40 feet wide and 15 feet deep, and was handled by making two cuts. Cut No. 3 was made 2000 feet long, 30 feet wide

Crossing the Stream and Getting Ready to Crawl Out.

and 15 feet deep. This cut required very careful handling because of its being through a former landslide.

Practically all the excavated material was used for fill. Koppel 5-yard cars, pulled by 10-ton Davenport locomotives, and 3-ton trucks were used for haulage purposes.

Among other equipment on the job were two cranes, a 35-ton McMyler and a 20-ton McMyler, a 14-S Smith mixer and a 7-S Fager Mixer. This equipment was used in the construction of concrete bridges.

Bridge at Camden, New Jersey

The Foley organization does a great deal of bridge work, and are well known in the East for this type of work. The bridge at Camden, New Jersey, was a deck plate girder bridge spanning a 100-foot highway. This job was started on November 1, 1925, and finished on October 1, 1926.

The excavation on this job amounted to approximately 15,000 cubic yards. As it was most all for pile foundation, it was of such dimensions that shovel equipment could not be used. A Link-Belt 20-ton crane was on the job for general hoisting duties, and a 21-S Smith mixer was used for the concrete work. This was very difficult work as the railroad had to be operated and the bridge built under traffic.

Bridge at Chester, Pennsylvania

Another very fine bridge job was at Chester, Pennsylvania. This was a sixteen-span bridge, concrete, flat slab and girder viaduct, spanning five tracks, main line to Baltimore from Philadelphia. Included among the equipment on the job was a McMyler 15-ton crane mounted on caterpillars, a 21-S Smith mixer, a 7-S Fager mixer, an Insley tower and hoist, and a concrete mixing and placing plant. This job also had to be built without interference to traffic.

John F. Kunz, Chief Engineer for the T. J. Foley Co.

Classification Yards at Altoona, Pennsylvania

Back again into railroad yard work, we find the company having completed a job at Altoona, Pennsylvania. This work, started on January 1, 1926, and finished by December 1, 1926, involved the laying of approximately 65,000 feet of 100-pound rail. The object of the work was to tie together two yards, giving a large extension for classifying cars. Approximately 2500 cubic yards of excavation was involved in the building of grade. A double concrete arch bridge, 300 feet long, was also built in the course of preparing the yards. This was a double-barrel structure, each barrel with a 25-foot span and 300 feet long. A 75-foot scale was built, and four buildings in connection with scale operations. This also was very much of a traffic job, as no hindrance of train movement was allowed.

Filtration and Water Softening Plant at Allegheny, Pennsylvania

The water softening plant built for locomotive service at Allegheny, Pennsylvania, gives an idea of the many and varied types of work the Foley Company handles. This plant is the first of its kind on the Pennsylvania Railroad system, and if it proves successful after a thorough trial it will be adapted as standard equipment and installed at other important locations. The equipment installed at this plant consisted of a 375,000-gallon steel storage tank, Gravier water softening units

A General View of the Yard Extension Job at Massillon, Ohio.

and Worthington vertical pumps driven by Westinghouse motors.

Two brick buildings, thirty feet by sixty feet in size, contain all the equipment. The excavation for these was about 1500 cubic yards, and concrete work amounted to approximately 2000 cubic yards. The job was started on January 1, 1926, and finished by August 31, 1926.

Yards at Weirton, West Virginia

The handling of yard work, laying additional main line and switch tracks, and enlarging classification facilities, constitutes the greater portion of the contracts handled by the Foley organization. By noting the starting and completion dates it will be seen that many jobs are in progress at the same time. This alone is sufficient evidence of the magnitude of the company.

The job at Weirton involved the laying of about 70,000 feet of 130-pound rail for main line track and 25,000 feet of 100-pound rail for yard tracks.

The excavation work necessary for enlarging the yards and preparing the grade amounted to 75,000 cubic yards. It was handled in two cuts 1000 feet long and about 20 feet deep. An Erie ¾-yard shovel, working one 10-hour shift per day, finished the excavation in 130 working days. This was practically all involved in a side hill cut of common earth excavation and was easy digging.

The spoil was all used for fill in building up grade, and was hauled from the shovel in 12-yard dump cars. In addition to the waste from excavation used for fill, there was also about 500,000 cubic yards of slag cinders and mill refuse used. This was brought in on cars and unloaded by cranes. Coal loading facilities, inspection pits, yard office, overhead bridge, and a 70-foot span under grade bridge was built under traffic, keeping railroad operating above, and highway and street car line open below.

Main Line Tracks at Broadacre, Ohio

At Broadacre, Ohio, some 10,000 feet of 100-pound rail was laid for main line track. This job was started on September 10, 1926.

The excavation amounted to about 45,000 cubic yards, and consisted mainly of shale, which offered some tough digging in places. A Bucyrus 41-B steam shovel was put into this work. Practically all the digging was involved in three side hill cuts. Two of these cuts were 500 feet long, each involving about 3,000 cubic yards excavation. The third and largest cut was 500 feet long, but considerably deeper than the other two, and was handled in two lifts. This cut amounted to about 39,000 cubic yards of excavation.

The spoil was all used in making fills to build up grade for the track laying. The material was taken from the shovel in 4-yard Koppel cars, hauled by two 10-ton Porter Dinkey locomotives.

Two concrete arch bridges were built on this job. One of them contained three arches and the other one arch, each with 30-foot span.

There are numerous other jobs in progress at all times, including yard enlargements, track elevation work, main line work, bridge and viaduct work, and many other types wherever there is excavation, construction or concrete work to be done.

The Foley Company specializes in operations of a difficult character, such as railroad main line traffic operations where the work must be done while trains operate. They have built up a very enviable reputation in this line.

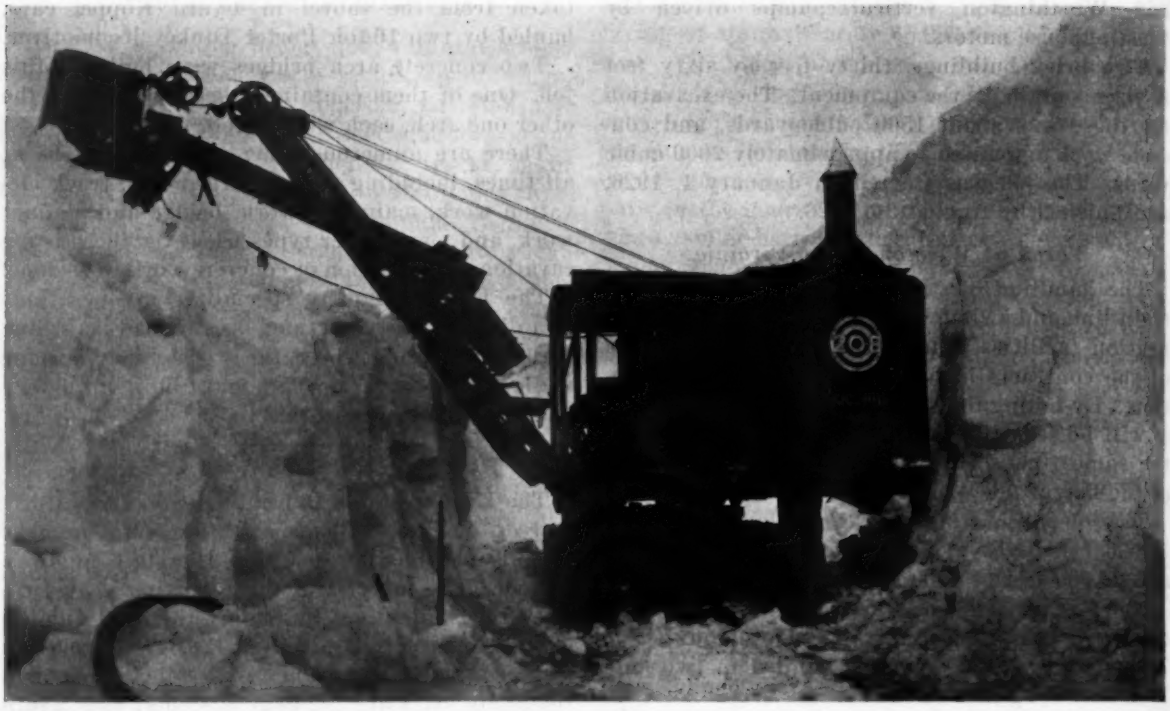
Road Mileage in Various Countries

The United States Department of Agriculture, Bureau of Public Roads, gives the total number of miles of existing roads in the state highway system as of the end of the reporting year 1924 as 259,721 miles. Of this figure the total number of miles of roads is given as 128,347. From the same source is the grand total mileage of rural roads not on state highway systems; this figure for the United States is amazing in size: 2,743,195 miles — of which 339,558 miles are surfaced.

These figures assume a much greater significance when they are compared with the figures compiled from reports received during 1926 for countries other than the United States.

The figures are as follows:

Algeria	2,321 kilometers.
Australia	23,354 miles metalled, graveled or ballasted.
	15,695 miles formed only.
	32,512 miles cleared only.
	33,203 miles natural roads.
Belgium	10,000 kilometers passable at all times, but in general poor repair.
British East Africa	16,098 miles, about half of which are not passable at certain times of the year.
Burma	18,647 miles, including 2,127 miles metalled.
Canada —	
British Columbia	17,200 miles.
Manitoba	1,600 miles (368 graded — 432 graded and gravelled).
Ontario	67,786 miles, of which 36,153 are passable all year.
Quebec	40,000 miles.
Ceylon	4,000 miles good.
	4,250 miles passable all year.
	5,400 miles passable in dry weather.
Dominican Republic	700 kilometers first-class.
England and Wales	153,198 miles, of which 18,972 are Class I, and 11,511 are Class II.
Federated Malay States	4,542 miles metalled.
Irish Free State	54,000 miles of road, including Northern Ireland.
Lithuania	744 miles, 638 miles of which are passable for motors except for a few weeks in mid-winter.
Norway	8,778 miles of main highways.
	13,385 miles of rural highways.
Palestine	584 kilometers of good metalled roads.
	2,400 kilometers secondary roads, not passable during winter rains.
Philippine Islands	3,517 miles of first-class roads.
	1,466 miles of second-class roads.
	1,639 miles of third-class roads.
Portugal	13,500 kilometers, including 4,500 almost impassable.
Scotland	25,007 miles, of which 5,356 are Class I.
Tunis	6,600 kilometers passable in dry weather.
	4,000 kilometers passable all year.
Uruguay	435 miles good motor roads.
	746 miles passable all year.
	72 miles passable in the dry season.
Yugoslavia	44,590 kilometers, of which 30,000 have been repaired since the war.



Digging in 20 feet of snow in the "Big Drift" just east of Fall River pass. The dipper is 21 feet above the roadbed. Drift lies on sidehill section sloping 30 degrees toward left. All snow was dumped on lower side.

Digging Snow with a Revolving Shovel at an Altitude of 11, 797 Feet

Removal of an Abnormally Heavy Accumulation of Snow on the Fall River Road in The Rocky Mountain National Park at a Height of Over Two Miles.

FALL RIVER ROAD crosses the Continental Divide at an altitude of 11,797 feet. It connects Estes Park village on the east side of the range with Grand Lake on the west side. It is one of the most spectacular highways in the National Park. It is 40 miles in length.

It would be blockaded at least ten months in the year if natural melting were depended upon to clear it. However, the official opening day of the park is June 15, and as railroad tickets sold all over the United States include tranportation through the park via this highway on busses it is essential that it be in passable condition on the above date.

The magnitude of the snow-clearing project depends upon snow conditions during the preceding winter, and is therefore a variable factor from year to year. Normally, approximately 15 miles of road — about 7½ miles on each side of the pass — must be cleared.

The depth to which the snow covers the roadway is another variable factor. In places where the line traverses exposed points, patches will be kept swept bare by wind action, but these are balanced by the accumulation of hard-packed drifts where sheltered pockets afford the air currents an opportunity to deposit their cargo. Such drifts generally conform to the sloping topography of the mountain side. They may be two feet deep on the outer edge of the highway, and 12 to 15 feet deep on the inside.

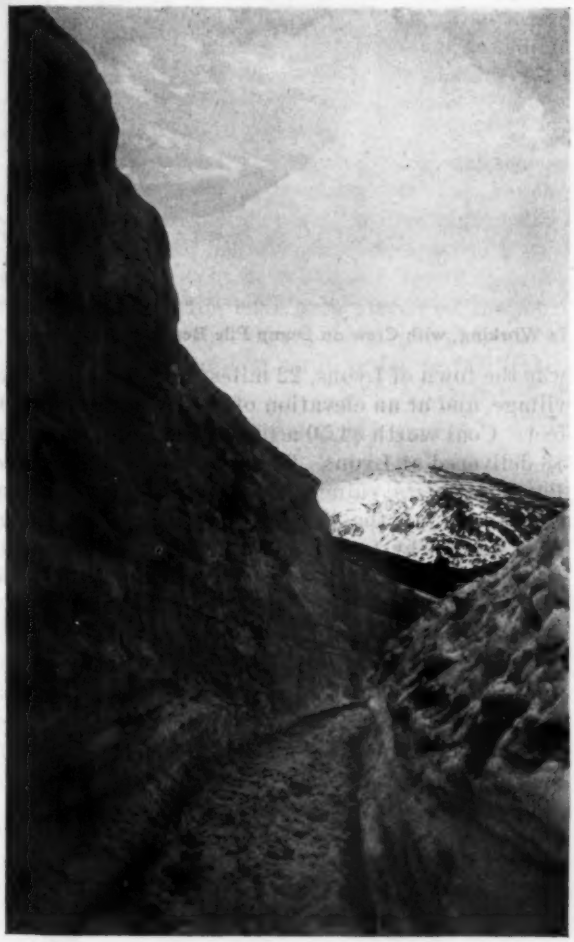
Regardless of the winter's precipitation, the road crews know that they will have one tough job on their hands. Just east of the pass proper, the ground lends itself to the formation of a huge snow cornice. Gales which sometimes reach a 90-mile velocity constantly play across the top of the pass, picking up the snow almost as it falls and dropping it as they spend their fury within the sheltered zone beyond the jutting backbone of the continent.

The road, just before reaching the summit, cuts squarely through this cornice. Every spring it presents a white barrier 1,500 feet long and from 20 to 30 feet deep. Its removal constitutes the largest single operation on the entire project.

The opening of the road is in the hands of the park officials, the campaign being planned and di-

rected by the park superintendent, Roger W. Toll. In the past various methods have been employed, hand-shoveling and dynamite being depended upon almost exclusively up to 1925.

In that year the National Park Service purchased a Bucyrus 20-B shovel. It was used successfully the first year, but was not given a real test, as those in charge chose to experiment with it and learn its capacities and limitations.



Looking back down through lower section of "Big Drift." Wall at left is 24 feet high. The shovel was run into this portion of the drift on mats, five feet above roadbed, and lower cross section shoveled by hand to width sufficient to allow passage of vehicles.

In 1926, however, the brunt of the work was allotted the shovel, with thoroughly satisfactory results.

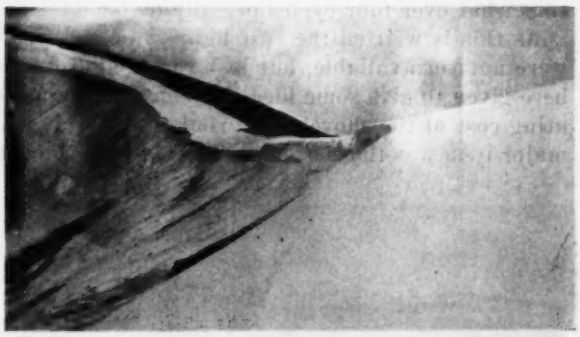
If it were feasible to start work early enough in the spring, the shovel could perhaps start at the foot of the pass on one side and work its way across and down the other side. However, at such altitudes storms are common up to June 1, and there is the constant danger that channels opened through the drifts would be filled again by fresh snow and wind action. Accordingly, experience has shown that May 15 is the earliest date at which operations can be opened, and even then it is always expected that some stretches of road will have to be cleared several times.

This year all work on the western side of the pass was delegated to hand shovelers and teams. The crews started on May 15 at a point approximately nine miles from the summit.

On the east side, the shovel had been left last fall at milepost 14.7 out of Estes Park village. As the pass grade reverses at milepost 17.8, the shovel was assigned 3.1 miles of roadway, constituting the heaviest drifts, and including the mammoth 1,500-foot cornice just east of the pass.

The shovel began its trip up the pass, working in drifts averaging from 6 to 8 feet deep, with occasional depths as great as 12 and 15 feet over the length of "The Big Drift."

As the shovel had been purchased with the expectation of using it in this "Big Drift," it was equipped with a high lift, giving it a dumping height of 21 feet above the roadbed. However, for a distance of 200 feet at its lower end, the big drift measured 24 feet on the average, and it was necessary to make special provisions. This was handled by using wooden mats designed by Superintendent Toll. These consisted of three layers of 3-inch by 12-inch planks, the middle layer transverse to the upper and lower layers. Four of these mats were employed. By laying these mats, it was possible to run the shovel into the drift five feet above the roadbed, thus giving ample clearance space for dumping. The lower five feet thus left was removed by hand shoveling. To give the caterpillars traction on these mats, the crawler plates were studded with half-inch bolts at suitable intervals.



Where the shovel had yet to travel. Looking toward the pass on top of the gigantic snow cornice which forms annually. View taken from about longitudinal center of drift.

The use of the mats proved entirely successful in penetrating the 200 feet of deepest snow. From that point on dumping could be effected from the roadbed.

Looking Back at Shovel from Top of Drift in Which It Is Working, with Crew on Dump Pile Beside the Dipper.

A special snow dipper was used throughout the work. With a capacity of 1½ yards, it was computed that it handled an average of 1.33 yards.

Figures of yardage handled are enlightening. If four swings a minute were made as an average, the yardage would figure 320 an hour or 2,560 to the 8-hour day, and 3,200 to the 10-hour day, as the shift varied between these periods of work.

The actual figures compiled by Superintendent Toll show that for the 24 days of operation, the total yardage was 70,628. This is an average of 2,942 yards a day. It is apparent from these data that little time was lost, and that the speed was somewhat over four cycles per minute.

As this is written the cost figures for this year were not yet available, but last year's figures are here given to give some idea as to cost. The operating cost of the shovel was around $75 a day. A major item was the coal bill. The closest railhead was the town of Lyons, 22 miles east of Estes Park village, and at an elevation of approximately 5,300 feet. Coal worth $4.50 a ton at the mines came to $8 delivered at Lyons. The trucking cost to Estes Park made its value $12.50 a ton there. After trucking it up the pass, piling it and delivering it as needed by team and wagon to the shovel, it cost $20 a ton on the job. The consumption was 1½ tons daily, or $30.

The labor force on the shovel consisted of an operator, fireman, and roustabout, together with two teamsters, two laborers and a cook. Total wages came to $41.70 a day. Cost of repairs was so negligible as not to appear in the tabulation. If incidentals are figured at $3.30 a day, the operating cost comes to the $75 above mentioned.

In addition to its lower cost, the shovel proved another advantage. It clears the roadway to a width of 15 feet, while only a 7-foot channel is

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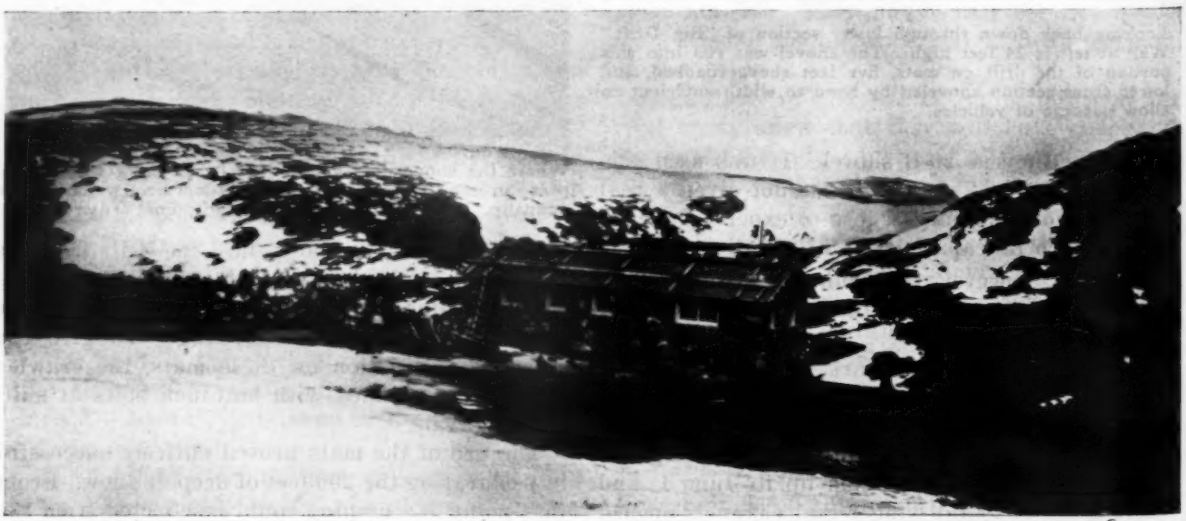


Where the shovel crew stayed. Rustic stone house erected by Park Service at altitude of 11,500 feet to house workers. Note how roof is weighted down to prevent damage from high winds which prevail during winter and spring.

Quarrying Stone for a Cement Company in Spain

Quarry Operations of the Cemento Artificial Sanson Works, About Ten Miles South of Barcelona. The Average Production of Cement from This Plant Is 10,000 Tons per Month.

UP in the northeastern corner of Spain at San Feliu de Llobregat, just a short distance south of Barcelona, is the cement plant and quarry called the Cemento Sanson Works. This plant is owned by the Auxiliar de la Construccion and produces an average of 10,000 tons of cement per month.

The quarry, which is the excavating engineer's main interest here, is operated on the bench system, each bench being about 23 feet high. The quarry face overall is approximately 165 feet high. In order to form the benches and break up the stone, Sullivan drills have been placed on the job. After the stone is shot down, the larger pieces are again drilled and broken up in order to facilitate handling.

General View of Crushing Plant and Quarry.

Electric Shovel Used in the Quarry

The stone is loaded out of the quarry by an electric three-motor shovel, a Bucyrus 50-B. This machine was installed in the quarry early in the year 1926, and from then up to the month of November it had loaded out approximately 200,000 tons of material.

Cars Travel from Quarry Face to Crushing Plant by Gravity

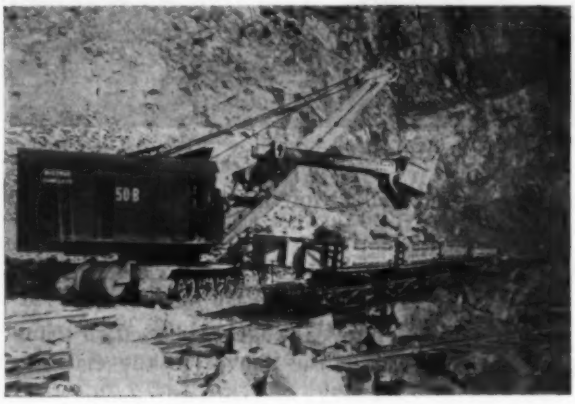
Two trains of four cars each are used to transport the stone from the shovel to the crushing

Train of cars being loaded at the shovel. Note the train of empty cars coming back on a second track pulled by an electric capstan at the end of the quarry.

plant. These cars each have a capacity of four cubic yards. Since the quarry floor is on a slope, the loaded cars are let down to the crushing plant by gravity, and are controlled by a special braking system. After dumping at the crusher, the empty cars are hauled back on another track by an electric capstan situated at the end of the quarry on the opposite side of the shovel.

Crushing Plant

At the crushing plant the cars dump into a hopper which opens onto a conveyor. This conveyor



A close-up of the shovel at work in the quarry. Note the rough character of material handled.

in turn carries the stone to a 48-inch x 40-inch crusher, and from this the stone passes to a Williams Mill. From the Williams Mill the material is carried by a belt conveyor to a dump on top of the loading station. This loading station places the stone into the buckets of an aerial ropeway system some two and a half miles long, which connects the quarry with the cement plant.

Don Joaquin Molins is General Manager of the Cemento Sanson Works.

Digging Snow with a Revolving Shovel at an Altitude of 11,797 Feet

(Continued from page 256)

made by hand work. While the shovel, therefore, handles twice as much snow to clear the same distance, the additional width is valuable, as it opens the ditch and allows the road to dry out much more rapidly.

The operator describes his experience as on the whole exhilarating and interesting. As most of the road is built on steep side hill sections, and there was no effort to mark the line on top of the snow, great care had to be exercised in keeping the proper alignment. This was effected by "feeling" with the crawlers, and by making soundings in the snow at the outside of the road from time to time.

Throughout the progress of the work, the shovel crew lived in a rustic stone house built by the National Park Service just east of the pass at an altitude of 11,750 feet. In previous years the workmen have had no shelter other than tents, which proved very unstable in the face of high winds.

The shovel is used during the summer and fall months on road construction within the park.

A Dozen Don'ts on Selling

Here are a list of rules contributed to the Crushed Stone Journal by a member of the National Crushed Stone Association. We reprint them here, as we feel that they apply whether you have crushed stone to sell, whether your product is sand, gravel, coal, or whether you are a contractor with the services of your equipment and experience to sell.

1. Don't ever tell a customer a lie. If you can't tell him the truth, then keep still. You will win his confidence in the end.
2. Don't knock your competitor. If your customer claims due praise to this competitor, say, "I grant you that, but—," and then plead your case.
3. Don't sulk if you don't get an order you have worked hard on. This man is going to do work again where in all probability you will sell him.
4. Don't let your attention to the customer cease on obtaining his orders. Keep following the jobs. Perhaps you can help him some time.
5. Don't give up the hope of selling even a few carloads on every job you follow until the job is finished.
6. Don't solicit an order if you can't fill it.
7. Don't refuse to fill in no matter how small the quantity. A friend in need is a friend indeed.
8. Don't talk your customers over with anyone.
9. Don't ever think the customer is wrong, for he is always right! Then adjust matters the best way possible.
10. Don't fail to be ahead of time for an appointment.
11. Don't fail to give a customer service. He will pay more money for reliable service.
12. Don't let the order get away from you, but if it does, bear in mind some of the above.

"Who was that peach I saw you with the other night, John?"

"That wasn't any peach; she was a grapefruit."

"Why grapefruit?"

"When I squeezed her she hit me in the eye."

Rastus: "Boy, it was so cold whar I cum frum we used to frow water out de window and slide down on the icicle."

Mose: "You all talk nuff'ns. Whar I libe, it's so cold we gotter build fiahs under de cows to keep em fum givin' ice cream."

Inquiring Lady: "How much milk does your cow give a day?"

Truthful Boy: "About eight quarts, lady."

Inquiring Lady: "And how much of that do you sell?"

Truthful Boy: "About twelve quarts, lady."

Buffalo Commercial.

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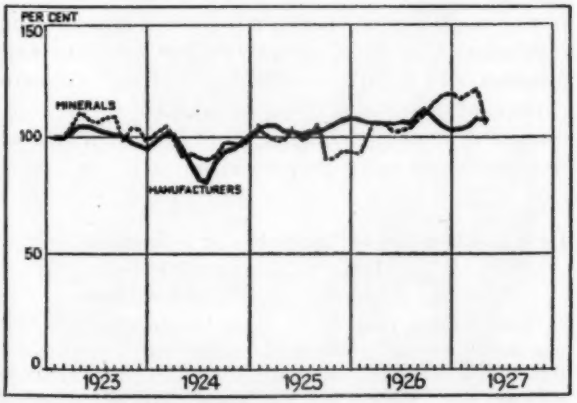
The Business Situation

May building and engineering contracts continued in very satisfactory volume, according to F. W. Dodge Corporation. Last month's contract total for the 37 states east of the Rocky Mountains (including about 91 per cent of the country's total building volume) was $552,348,500. This was only 9 per cent under April and it was about half of one per cent over May of last year.

The May contract total brought the amount of construction started since the first of this year up to $2,555,515,300, which is only 1 per cent behind the corresponding five months of 1926, a much better showing for this year than has been anticipated by some.

Last month's record included the following important items: $219,979,900, or 40 per cent

PRODUCTION OF MANUFACTURES AND MINERALS



Index numbers of production of manufactures and minerals, adjusted for seasonal variations (1923-1925 average = 100). Latest figures, April, 1927: Manufactures, 109; Minerals, 107.

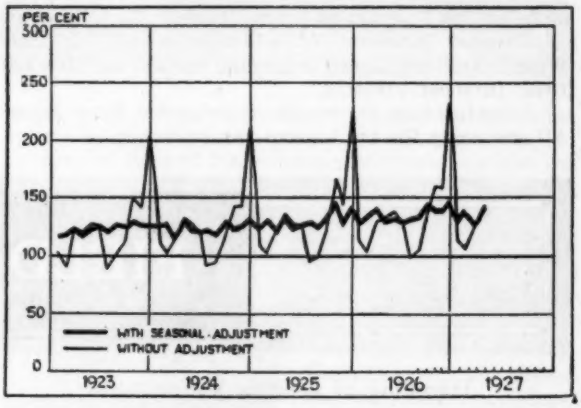
of all construction, for residential buildings; $111,367,300, or 20 per cent, for public works and utilities; $72,541,100, or 13 per cent, for commercial buildings; $44,888,800, or 8 per cent, for industrial buildings; and $34,545,100, or 6 per cent, for educational buildings.

Contemplated new work was reported in May to the amount of $847,458,900. This was a 2 per cent decrease from the amount reported in April, but a 7 per cent increase over the amount reported in May of last year. The record of contemplated work indicates a strengthening of construction demand.

The Weekly Bulletin of The National Crushed Stone Association for June 4th gives the figure of 233,615 for the number of cars of stone, sand and gravel loaded in the month of April — an increase of 13,046 cars over April 1926 and 2,693 cars over the same month for 1925.

While these figures for building construction are of vital interest to the excavating engineer, our industry, like every other branch of business, rests upon a much broader basis. A better idea of what

DEPARTMENT STORE SALES



Index of sales of 359 stores (1919 = 100). Latest figures, April, 1927: Adjusted Index, 140; Unadjusted Index, 143.

lies before us may be found by a study of general business conditions than by a study of only one industry — our own activities rest on the general welfare of the country.

Money is plentiful for all business needs, and the rate for call loans is 4 to 4½ per cent, somewhat firmer than is usual at this time of year. Much gold has recently been imported, but commercial loans are high, loans secured by stocks and bonds are high, and bank investments show an unusually large increase since the first of the year.

An analysis of the cotton situation indicates that the total loss of crop because of the great flood will probably be less than 500,000 bales, an amount less than expected fluctuations from year to year. The recent firming of cotton, although partly due to anticipation of the supposed results of the flood, rest upon an active demand for cotton goods that has developed since last fall in all countries.

Steel is apparently being bought on the "from

hand-to-mouth" principle. The industry is operating at about eighty-five per cent of capacity, and an increasing volume of small orders suggests the conservative policy of keeping low inventories, which has been so marked during the past many months in almost all branches of business.

Conditions for the corn crop have not been ideal, but the latest reports, as this is written, promise better conditions for the crop which is now several weeks behind.

The automobile industry is active; there has been considerable decrease from the figures for the first part of last year, but not as much as was generally anticipated.

Department store sales, an indicator of retail buying, and therefore of expenditures by the public, is decidedly high for this time of the year.

According to the Federal Reserve Bank of Chicago, production of both manufactures and minerals are above the 1923-1925 average.

From THE MAIL BAG

"Sirs:

Enclosed please find one dollar ($1.00) to have my name on the Board, and please publish the following:

Earnest Mackson of Chicago is on an Erie Whirlie and Bob Jones is keeping her hot for Howard Bros. in West Virginia.

I am heading for South America for Paty Joyce. All are ready for the bananas and pineapples.

Please send magazine to Weston, West Virginia.

Yours truly,

CECIL BAILEY

Formerly known as Skyrocket Bill."

"Sirs:

You will find inclosed $1.00 in stamps for subscription for The Excavating Engineer. Please send me all back copies from the first of the year, that would make my subscription start from the first of the year. I built a house on a truck and I find it is very satisfactory. I can go from one job to another at very low cost. I am back with the Road Construction Co. This job will last sixty days.

Yours very truly,

MR. J. E. STRICKLAND."

Handling of Electric Detonators

Electric detonators and squibs should be handled very carefully, cautions the Bureau of Mines, Department of Commerce. Rough handling may break the bridge-wire connections. Bringing electric detonators into contact with any source of current may cause enough current to flow in the bridge wires to heat them to firing temperature. Serious accidents may result from the explosion of the detonator alone.

The best practice, and the one which is required by law in several states, is to keep electric detonators in non-conductive boxes or bags until the shot firer is about to use them, and then to remove only the supply immediately needed. Electric detonators should be so removed from their boxes that the ends of the leg wires do not come in contact with any source of current; even telephone, signal, and portable electric-lamp circuits carry enough current to fire them. One precaution advocated by the Bureau of Mines is to twist the bared ends of electric detonator leg wires together at the outside of the mine, and keep them so until just before firing, then untwist them and connect them to the firing lines.

Electric squibs and detonators should be stored in a cool, dry place. If they are left for a long time in a warm place the waterproofing material in the insulation of the leg wires dries out, and the insulation may break when the legs are bent and misfires may result in wet holes. The explosive charge of the detonators is readily affected by moisture, hence prolonged storage in a damp or wet place may cause deterioration.

How to Clean the Oil Reservoir of a Gasoline Engine

By G. S. HAMILTON

Climax Engineering Co., Clinton, Iowa

Once every year it is desirable to drop the oil pan and thoroughly clean the reservoir of your gasoline engine. Simply changing the oil in the crankcase will not do. After a certain length of time, sediment will accumulate and only a thorough cleaning will remove it.

Many operators may be familiar with the details of cleaning the reservoir, but for the new user of industrial gasoline engines, the following instructions will be helpful. Proceed as follows:

1. Clean outside of pan to keep grit out of crankcase when open.
2. Drain off old oil.
3. Remove the oil pan stud, screws and bolts.

4. Drop pan, being careful not to damage gasket.
5. Wash out oil pan with kerosene or gasoline and dry out with lintless cloth. Do not use waste. The threads and lint are likely to clog the oil ducts.
6. See that crankcase gasket is in good condition, and in proper position. If necessary, replace with a new one.
7. Cement gasket tightly to oil pan flange, using shellac.
8. Cover upper face of gasket with grease or hard soap soaked in water. This will check leakage and permit oil pan to be removed when necessary, without breaking the gasket.
9. Replace pan and tighten screws and bolts, tightening a little at a time on each one to distribute the strain evenly.
10. Refill oil reservoir with proper amount of fresh oil of correct grade and see that indicator registers "Full."

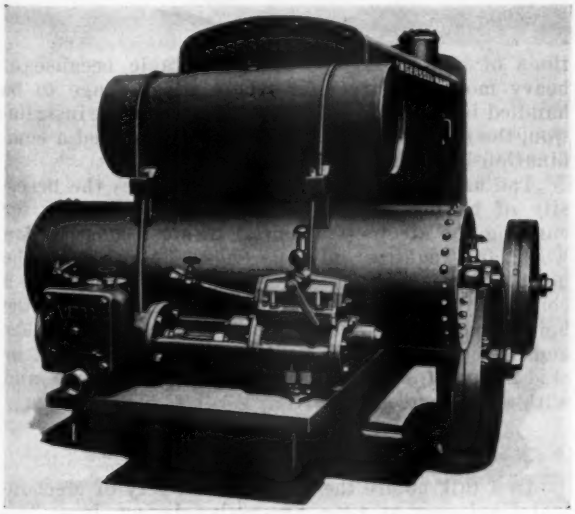
Dynamiting a Boat Canal

A canal 700 feet long, 15 feet in width at the top, and approximately 6 feet deep, was recently blasted out by dynamite at Cedarhurst on the Chesapeake Bay, where it was decided to have a harbor where boats could be brought in from the Bay at night or in storms. This unusually large ditch was shot by Harry Gough, a blaster of Waldorf, Md.

In describing the method used, Mr. Gough stated that he marked off lines of holes with two pieces of twine about four feet apart, punching holes with a bar about twenty inches apart and putting three sticks of 50 per cent straight dynamite down in the holes. The holes were about 4½ feet deep. The ditch was shot in sections, and the propagation method, where the detonation of one dynamite cartridge explodes all the others, was employed. The entire job was accomplished in four and one-half days, at an approximate cost of $330.

A Dependable Portable Compressor-Pump Outfit

The Ingersoll-Rand Company, 11 Broadway, New York, has perfected a new combined portable air compressor and water pump outfit. It consists of a standard Type Twenty Gasoline-Engine-Driven Portable Compressor and a Cameron Air-Driven Pump. It is recommended by the manufacturer as suitable for dewatering jobs, and can be used successfully for the elevation of water, for removing the overnight accumulation in ditches and excavations, for cement



gun service, and for furnishing water to concrete mixers, etc. The portable compressor, in addition to supplying air for the pump, will run such air tools as rock drills, paving breakers, clay diggers, portable hoists, drill steel sharpeners, etc.

The pump is positive in action, starting up just as soon as the air is turned on. It requires no priming and will handle very muddy water. It can also be regulated to any desired capacity within its maximum rating by adjusting the amount of air admitted.

Several sizes of these compressor-pump outfits are available. It is also possible to obtain the pump alone, together with all parts necessary for attaching it to any Ingersoll-Rand Portable now in the field.

New Jack for Finishing Machine

A jack for mounting the transportation wheels on finishing machines has been developed by *The Lakewood Engineering Company of Cleveland, Ohio,* manufacturers of Lakewood screeds and tampers.

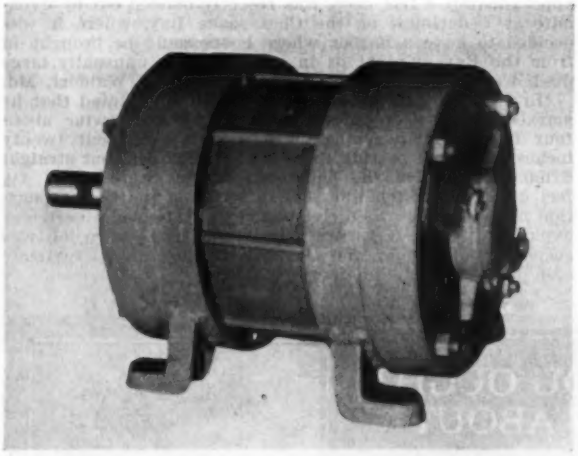
This jack enables the contractor to remove or install the transportation wheels on the job. The photo shows how the finisher is raised and lowered.

Announcement of All Steel Line of Ball-Bearing Induction Motors

A complete line of all-steel, ball-bearing polyphase induction motors, ranging in size from 1 to 100 horsepower in all standard voltages and cycles, is announced by *The Lincoln Electric Company of Cleveland, Ohio.* This type of motor is representative of the new designs of equipment being brought out by The Lincoln Electric Company, in which gray iron and malleable castings have been entirely replaced by hot-rolled steel.

It is claimed that every part of the motor is at least twice as strong as the former type which was built with a cast iron frame. An example of the

increase in strength of the frame is cited in the case of the motor feet. Drop-forged steel feet are welded on to the hot-rolled steel end rings of the motor. This, it is claimed, eliminates a common source of difficulty with electric motors, arising from the fact that cast



iron feet are frequently broken off in rough handling. The end brackets or bearing supports are also made up of welded steel construction, giving a complete all-steel motor.

Economies in manufacturing by the new process have permitted the use of much larger shafts and bearings than is usually found on this type of equipment.

Owing to the greater strength of steel as compared with cast iron, less thickness of metal is required in the frame. It is claimed that the increased ventilation so obtained results in a considerable increase in the overload capacity of the motor, so that a continuous overload of from 10 to 50 per cent can be handled by the motors, depending upon the size and speed.

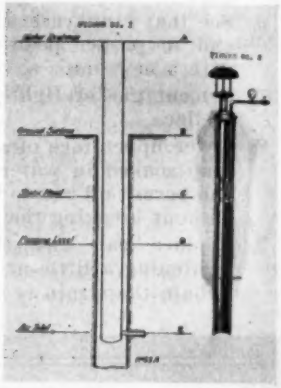
Ingersoll-Rand Air Lift

The air lift was originally used almost entirely for the pumping of water from drilled wells. The principle upon which this device is built is comparatively simple, and a condensation of a description

received issued by the manufacturer will probably be of interest to many of our readers.

Today the usefulness of the air lift is extending not only to water wells but the same general principle is being applied to the pumping of oil wells, the unwatering of mine shafts, and for lifting mine tailing and ores, sand and water, dredging, and in the general service connected with the lifting of acids.

The accompanying illustration will make the principle clear. Air under pressure is forced into the liquid, at E, at bottom of deducting pipe (a large pipe leading from the inlet level to the discharge level). This air forms into bubbles distributed through the column of liquid in this pipe and makes the total head (in pounds per square inch) less than the total head from D to E of liquid without air mingled with it. This difference in head forces the water out through the top of the well, (at A).



New Combination Hoist and Compressor

To meet the requirements of a definite class of steel erection jobs, where heavy, permanent installa-

tions of equipment are not practicable because of heavy moving charges, or where the tonnage to be handled is too small to warrant a permanent installation, the *Novo Engine Company* has developed a combination hoist and air compressor unit.

The use of this combination eliminates the necessity of having a separate air compressor unit for running the air tools essential in steel construction work, and requires only one engine to run both the hoist and compressor. The machine is mounted on a common frame, the engine being placed between the hoist on one end, and the compressor on the other end of the frame. The units are furnished truck or skid mounted, either single or double-drum type, and with or without air receiver.

Upkeep of Electric Shovel

In a talk before the American Society of Mechanical Engineers at Erie, Pennsylvania, on June 3rd, Mr. R. H. Rogers, of the General Electric Company, talked on "Conditions and Effects of Electric Drives to Older Methods." Regarding the electric shovel he said as follows:

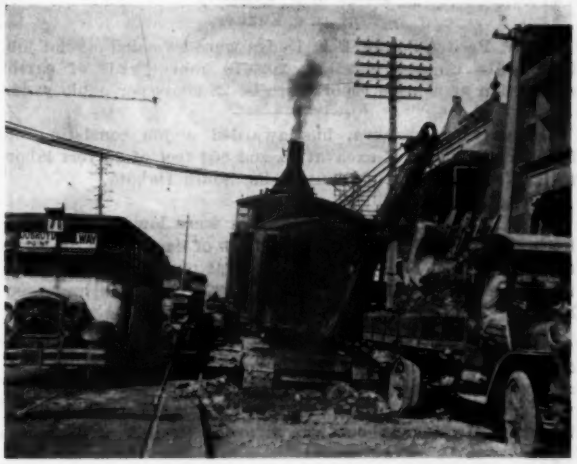
"Mining calls for the use of the largest power shovels for stripping overburden. Electric power shovels, besides lowering the visible cost per cubic yard, show remarkable superiority from the maintenance standpoint. The largest steam power shovels

require approximately $25,000 per year for maintenance, whereas the corresponding electric shovels are maintained for $5,000 per year. Little of that expense goes into the electrical features. The principal differences are in the steam plant upkeep and general repairs and replacements. Electric shovel drive, while more forceful than steam, has the faculty of minimizing shocks and strains, so that with greater yardage the wear and tear is wonderfully reduced."

Angelo Pastore & Son, General Contractors, 15 Highland Avenue, New Rochelle, New York, sent this picture to us and has the following to say concerning what they have been doing with this 31-B steam shovel, "As this machine was installed in August,

1926, it has handled up to date approximately 60,000 cubic yards of material, running about 75 per cent earth and 25 per cent rock. It loaded for six straight days between 900 and 1,000 cubic yards of earth excavation in eight hours work, which we think is quite a record."

The accompanying illustration shows the Bucyrus 20-B steam shovel owned by Concrete Constructions, Limited, at Sydney, Australia. The machine is work-



ing on the Parramatta Road, ripping up old pavement, which was concrete 8 inches thick but not reinforced. The material was loaded out into trucks, then the shovel went to work preparing the subgrade for new pavement.

Chicago and Vicinity

BY D. C. ANDERSON

Public Construction Co. of Hammond were awarded contract for sewers in Calumet City. The money valuation is better than a million dollars. Mr. Hosse and Mr. McCoy are actively in charge of all the work of this company.

McWilliams Dredging Co. and J. O. Heyworth were awarded contract for new levee at Beardstown, Illinois. There is 550,000 yards of dirt to be handled and 10,000 cubic yards of concrete. McWilliams is handling the dirt with Bucyrus machines, while J. O. Heyworth has the concrete work. Mr. Ewing is in charge for McWilliams and Mr. Bennett is chief engineer for Heyworth. The Heyworth organization is just completing the Mississippi River Bridge at St. Paul.

Carmine Roberts is getting along nicely on his Lyons sewer contract. His son is running one of the machines and does it like an expert.

F. Procente and Son of Chicago Heights are coming along on their sewer contract in Lyons. Harry John is on the job every day. The trench is through solid limestone. F. E. Ward and R. E. Reynolds handle the levers.

Mr. Clifton of E. Hancock Co., consulting engineers, has been on his vacation. We don't know whether he went fishing or anything about it, but we hope he is well rested for the coming year.

John Bransfield recently completed the excavation for a new Sears-Roebuck building at 62nd and Western. He used his Bucyrus 20-B on the high end on account of its ability to take a deep cut and load on the bank. He sublet part of the job to John Finn and Wm. B, Krug and Son. Their cut averaged two feet lower than the high end.

The writer had an interesting talk with August Sievers, pioneer South Chicago contractor, one evening last month. Mr. Sievers has many stories to tell of the early days when a good man could dig and wheel out 30 yards of earth per day.

H. P. Downey of Hammond always has a lot of irons in the fire. He is the hardest man to find we know of. Caught him at dinner last week, which was not so good. Here's hoping we have better luck next time.

Detroit and Vicinity

BY P. M. RICHARDS

S. J. Fattore has been awarded a drain contract in Macomb County. He now has two Bucyrus 50-B's and one Bucyrus 30-B draglines.

Mr. Geo. Patton has moved thee Detroit Park Boards Monighan dragline to Belle Isle from Connors Creek Park.

The City of Detroit has awarded sewer contracts in the amount of about two and one-half million dollars during June. This work is to be largely done in tunnels.

SHOTS FROM THE FIRING LINE — Continued

Caroll L. Williams of Grand Rapids has placed his Bucyrus D-2 in service with a clamshell bucket on sewer work.

Al. Duesing is digging canals near Lake St. Clair east of Mt. Clemens.

Iowa and Vicinity

BY H. C. EMERY

J. W. Peed & Son of Fort Dodge were awarded a road job in Fayette County, entailing 202,470 cubic yards of earth excavation at a price reported to be 28 cents per cubic yard.

Sioux County, Iowa, has awarded a job consisting of 57,962 cubic yards of excavation and 854 feet of culvert labor to C. W. McNamara of Sioux Falls, South Dakota.

J. H. Miller and Sons of Kellogg were low bidders at a letting of approximately 276,000 yards of excavation at Newton on May 27. No award was made at that time, due to the board considering the Miller bid of 37.9 cents as hung too high.

Guy Longerbone of Des Moines was awarded a contract covering approximately 200,000 yards in Iowa County recently. This is the job on which the bid of 40 cents per cubic yard made by Tom Mickle of Newton was rejected. We are informed Mr. Longerbone was awarded the job at 37 cents.

Jenner Bros. of Davenport were awarded a job improving the Bennett-Durant Road in Cedar County, known as County Project No. 1 entailing 100,438 cubic yards of excavation at 24 cents per cubic yard.

Kentucky Notes

BY B. R. ANDRES

McWilliams Dredging Co. are just starting a government levee job at St. Francis, Missouri. Mr. Crance is superintendent.

Carter, Carter and Braden of Clay, Kentucky, recently purchased a new Bucyrus D-2 clamshell machine for his work at Clinton, Kentucky.

Weldon Springs Quarry Co. of Weldon Springs, Missouri, report a rush of business this summer. Mr. Charles Miller, formerly with United States Gypsum Co., is superintendent of the quarry.

Mathews Bros. of Erie, Illinois, recently purchased their second Diesel dragline from the Bucyrus Co., a 30-B type, to assist in their work at Savanna, Illinois.

Callahan Construction Co. are making rapid progress on their River Des Peres job in St. Louis.

C. A. Colgrove of Fulton, Kentucky, has purchased a new Bucyrus 31-B clamshell machine to work on Robinson & Sons job at Clinton, Kentucky.

New Jersey, Delaware, Maryland, Virginia and Pennsylvania Notes

BY H. C. DAVIS

The following is the result of a letting held by the State Highway Commission, May 16th, at Trenton, New Jersey: Route No. 30, Mercer County, Pennington and Coodsville, Roads, Michael Staub, Pittman, New Jersey, low with a bid of $250,468 — there is 60,292 cubic yards earth excavation and 3,000 cubic yards rock excavation on this work; Woodsville and Ringoes Road, Michael Staub was also low with a bid of $322,081.75 — there is 41,825 cubic yards earth excavation, 4,100 cubic yards rock excavation, 4,863 cubic yards borrow on this work.

On May 17th at Baltimore, Maryland, the following were low on work let by the Maryland State Highway Commission: P. D. Philips, Salisbury, Indiana, Co. 43, No. 51; M. J. Grove Lime Co., Lime, Maryland, F. 89, F 103; Thomas, Bennett & Hunter, Westminster, Maryland, C-2-A, C-64; Thomas Mullan, Baltimore, Maryland, C-26.

R. C. Churchill, Roanoke, Virginia, is getting along nicely with Walnut Street Bridge job. E. P. Powell is superintending this work; J. W. Barnes is foreman; C. W. Thompson and S. L. Brimm are running two gas clamshells.

On May 23rd the following were low on work let by the State Highway Commission at Trenton, New Jersey: Section No. 14-B, Route No. 1 Extension, Newark Contract No. 6; The Clemente Construction Co., New York City, $213,500 — the principal item of work to be done is 146,000 cubic yards fill for embankment; Route No. 71, Section No. 8, Lakewood-Aldrich Road, Jannarone Construction Co., Belleville, New Jersey, $344,336.73.

Morris, Gray and Hunter, Roanoke, Virginia, have just finished a 200,000-cubic-yard job at Shawsville, Virginia. M. S. J. Hale was superintending the work. A Marion 60 and a Marion 37 were used and the crews are as follows: No. 60, L. M. Hurt, engineer; Henry Wells, craneman; Ernest Brooks, fireman; No. 37, P. C. Jennell, engineer; Wesliey Wright, fireman.

On May 27th the State Highway Commission at Harrisburg, Pennsylvania, awarded the following contracts: Mifflin County, R-29, Rauch and Kessler, Northernberland, Pennsylvania, $40,814.96; Monroe, Wayne and Lackawanna County, R-168, Johnson, Drake & Piper, Inc., Minneapolis, Minnesota, $340,105.12; Chester County, R-142, Union Paving Co., Philadelphia, Pennsylvania, $156,187.48; Clearfield County, R-59, Avery & Bailey, Philipsburg, Pennsylvania, $21,630.75; Lancaster County, R-280, Bridge over Chickies Creek, Paul H. Sherich, Inc., Lancaster, Pennsylvania, $59,207.66; Bucks County, A-4282, J. M. Hutchinson, Altoona, Pennsylvania, $81,688.80; Butler County, R-246, O. B. Bracht, Titusville, Pennsylvania, $9,311.04; Mercer County, R-213, Jamieson & Knapp Co., Fredonia, Pennsylvania, $8,176.74; Perry County, R-275, Swanger and White, Lebanon, Pennsylvania, $296,447.15; Luzerne County, R-170, R. H. Cunningham & Sons Co., Turtle Creek, Pennsylvania, $239,361.28; Montour and Northumberland County, R-2, Thos. B. Evans, Danville, Pennsylvania, $22,376.16; Wayne County, R-6, David Schoentag, Inc., Saugerties, New York, $436,946.20; Berks County, R-146, Wm. Sheidy, Wyomissing, Pennsylvania, $19,686.50; Luzerne County, A-3802, David Schoentag, Inc., Saugerties, New York, $171,464.15.

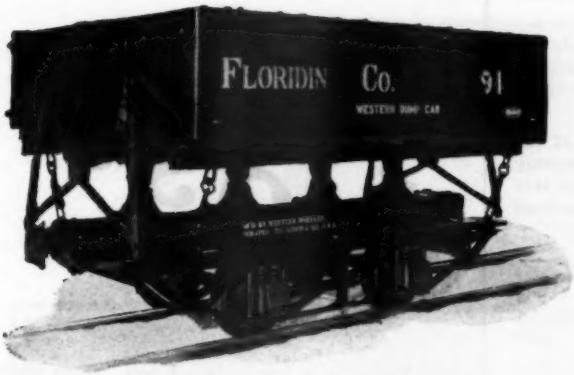
The following are some of the contracts awarded by the Virginia State Highway Commission at Richmond, Virginia, May 31, 1927: Route No. 10, Project No. F77-5, Leighton & Tinssley, Richmond, Virginia, $111,129.74; Route No. 12, Project No. F171, G. Y. Carpenter, Chester, Virginia, $130,491.68; Route No. 14, Project No. S436-A, Robert Martin & Co., $130,271.66; Route No. 201, Project No. S451, Concrete Steel Bridge Co., Clarksburg, West Virginia, $7,460.08; Route No. 24, Project No. S462, Lenten Bridge Co., Knoxville, Tennessee, $19,826.45; Route No. 101, Project No. St463, J. O. Sadler Co., $92,714.57; Route No. 37, Project No. S466, Marye & Blankenship, Shawsville, Virginia, $26,564.15.

The following were low at a letting held by the State Highway Commission at Dover, Delaware, June 1, 1927: Contract 82, State Road Wilmington Causeway, Wm. Isenberg, Canden, $198,551.50; M. J. Contract, CS57, Midway Angola, Old Line Construction Co., Chesterton, Delaware, $142,809.50 for store and $139,979.75 for another job.

Pennsylvania and Western New York

BY D. W. EVANS

Janashak and Callow of Cleveland have their Bucyrus 31-B sewer shovel working in about a foot of water in Big Creek digging hard shale out of the bed. They have a mile



Western

You Can Make More Money With WESTERNS

This is the type of car used for tunneling Musconetcong Hill for the Lehigh Valley Railroad.

WESTERN Equipment predominates on the new Frisco extension in Alabama.

WESTERN 4-yard or 5-yard Dump Cars are usually installed wherever shovel work requires narrow gauge equipment, because contractors have learned that they can make more money with WESTERNS.

A Few Reasons:

Great Strength of Construction.

Easy to Dump.

Ability to ride a poor track.

Quick and Inexpensive Repairs.

May we figure with you on your next contract?

Western Wheeled Scraper Company

Founded 1877

Builders of Dump Cars and Earth and Stone Handling Equipment

AURORA - - - - - ILLINOIS

SHOTS FROM THE FIRING LINE — Continued

or more to go to get out 8000 yards, but are traveling right along.

Vincent Schlair of Buffalo is coming on fine with his job on Scajaquada Creek. He built an electric hydraulic dredge to make the fill behind the piling, and says it is pumping away in fine shape.

Ed. Prefontaine is pulling the levers on a Marion 37 for Buffalo Dredging Company. They have the job of putting part of Buffalo Creek underground, and expect to have this section finished in a few months. Jim Waters is handling an Erie on the same job.

The King Brothers have moved their shovel from the Sims Construction Company's work at Oil City to the six and a half miles of road excavation job for Lewis and Frisinger in Mercer County, Pennsylvania.

Southern States Notes

BY W. W. WHORLEY

Sam Spooner dropped in to see us recently. He is handling a Bucyrus 30-B at Leeds, Alabama, for the Atlas Portland Cement Co. and tells us that he is raising chicks as a side line.

W. N. Hubbard is opening up a large quarry with a Bucyrus 100-B electric shovel for the Phoenix Portland.

John Morris is loading Barytes with a Bucyrus 18-B for the Bertha Mineral Co. at Cartersville, Georgia.

S. A. Lacy tells us that he has a Bucyrus 20-B and 30-B Diesel dragline in addition to his Bucyrus 41-B steam shovel all working on the Jackson & Eastern Railroad extension near Jackson, Mississippi.

The Alabama State Highway Department has installed a Bucyrus 31-B shovel near Bessemer, Alabama, at one of the convict camps recently established for road-building purposes.

B. E. Lewis is operating a Marion type 7 shovel near Dry Branch, Georgia.

G. S. Williams is superintendent in charge of the strip mine of the De Bardleben Coal Corporation near Corona, Ala.

L. H. Anderson, who has been operating a whirley for the Montgomery Sand and Gravel Co., paid us a visit recently.

M. S. Richey is operating a Bucyrus 20-B for the Alabama State Highway Department near Bessemer, Alabama. Mr. C. S. Morriss is superintendent in charge of this work, and under his experienced supervision the work is being carried on rapidly.

Fred Blunk, who has been operating a Bucyrus 50-B Diesel dragline for McWilliams Dredging Company, is now at Jackson, Mississippi, where this company completed a large contract for the N. O. & G. N. Railroad.

J. M. Armstrong who has been living in Texas for some time, returned to the Bham district recently and paid us a call.

C. B. Morrison & W. W. Bruce have been running opposite shifts on a Bucyrus 175-B shovel for the Manchester Mining Company near Jasper, Alabama.

The Alabama Sand & Gravel Company is installing a Bucyrus Class-24 dragline at their plant near Montgomery, Alabama.

A. G. De Arman is superintendent for the Spruce Pine Sand and Gravel Company at Spruce, Alabama. Mr. L. W. Lee is furnishing material for this plant with a Bucyrus 30-B shovel.

a day Lost

There is a big railroad job. The shovel is several miles from the nearest shipping point, working in a big cut. The end of the day is drawing near and the cut is just about finished. During the night the shovel will be moved onto the next cut, ready to start work the first thing in the morning.

But — at the last moment the hoist chain breaks. It is an old chain and repair work must be done or a new chain ordered. In either case there is delay — that costly item in the life of a contractor — "delay".

A day lost! Money lost! A contractor's shovel demands the use of hoist chain that will stand every hardship.

Combat that lost day by using the best chain available and then keeping extra chain on hand for the emergency.

BE SURE

S. G. TAYLOR CHAIN CO.

Established 1873

502 Marquette Bldg.,
CHICAGO, ILL.

In writing to S. G. Taylor Chain Co. please use post card bound in the center of this number.

Bucyrus dragline (Class-24) equipped with a Fairbanks-Morse Diesel Engine. The Diesel drives a generator supplying current for complete electrical operation. Interior view shows the Diesel installation in the rear

When cost is a factor *the Diesel takes first place*

When cost is a factor — and nowadays when is cost *not* a factor? — the big economies of Diesel power compel attention. Contrast high Diesel efficiency (32 per cent of fuel oil heat energy converted into horsepower) with the low efficiency of the steam unit (3 to 5 per cent of the heat in coal converted into actual work) and it is easy to appreciate the striking reductions that result from Diesel operation of excavating and dredging machinery.

Combine this greater efficiency of the Diesel with the low upkeep that goes with the simple, two-stroke-cycle, airless injection Fairbanks-Morse Diesel Engine — the simplest Diesel design yet developed — and you have *Diesel savings at their maximum!* This, in brief, explains the swing in popularity to Diesel power on draglines, shovels, dredges and other excavating equipment — and especially the growing preference for the F-M Diesel Engine for this type of service.

Write today for bulletins on the construction, operation and economy of the Fairbanks-Morse Diesel

FAIRBANKS, MORSE & CO., *Chicago*

28 branches in principal cities at your service

FAIRBANKS-MORSE DIESEL ENGINES

The Product F M *of Experience*

AOA60.3

SHOTS FROM THE FIRING LINE — Continued

Bert Waugaman is foreman for the Allen Gravel Company at their pit near Iuka, Mississippi.

Pacific Coast Notes

BY A. FARRELL

Haas, Doughty & Jones are nearing completion of their canal excavation contract for the Montague Water Conservation District at Montague, California. Mr. Arthur Jones has been in charge of the work, most of which has been done with a Bucyrus 20-B gas dragline, working three shifts. Mr. Jones expects to be through about July 15th.

W. H. Hauser Construction Company of Oakland and Englehart Construction Company of Eureka have each been awarded half of the contract for fourteen miles of the Redwood Highway north of Orrick by the State Highway Commission. The total job involves about 370,000 cubic yards of excavation, and is to be completed about November 15th.

Guerin Brothers of San Francisco have been awarded the contract for 7.58 miles of road in Plumas County by the United States Bureau of Public Roads. The contract includes 102,500 cubic yards of excavation, mostly rock. Mr. Ted Guerin expects to complete the job this summer.

The Santa Fe Railroad has let a contract to Sharp and Fellows, 533 Central Building, Los Angeles, for construction of several miles of railroad track between Las Vegas and Glorieta, which will eliminate several curves in the line. Two and a half miles will be retraced between Ojita and Sulzbaker, and about the same distance between June and Gise will be reconstructed. One and a half miles between Gise and Rowe will also be worked over.

Contract awarded to Alex D. Chalmers, 533 H. W. Hellman Building, Los Angeles, who bid $547,277 for improvement of San Fernando Road between Tyburn and Huron Streets, Los Angeles, work involving grading, concrete paving, storm drains, etc. Refer to our issue of May 4th for list of bids received by the Board of Public Works, Los Angeles, and for quantities of work involved.

Contract awarded to A. D. Kern, Portland, Oregon, who bid $3.90 a ton for heavy stone and $3.50 a ton for second-hand stone to be placed in jetty for repairs to north jetty, Humboldt Bay, Eureka, Humboldt County, work for United States Engineer's Office. Work involves 65,000 tons of stone.

Contract awarded to H. W. Rohl, 727 West Seventh Street, Los Angeles, who bid $395,387 for the construction of concrete storm drains, reinforced concrete pipe system in the Laurel Canyon storm drain system for the city.

Plans being made by county surveyor Laurence Moye, Visalia, Tulare County, bids to be called for in about a month for grading five miles of the Balch Park Road.

City of Lynwood, Los Angeles County, is considering paving various streets to cost $300,000. Robert B. Miller, Smith Building, Lynwood, is the city engineer.

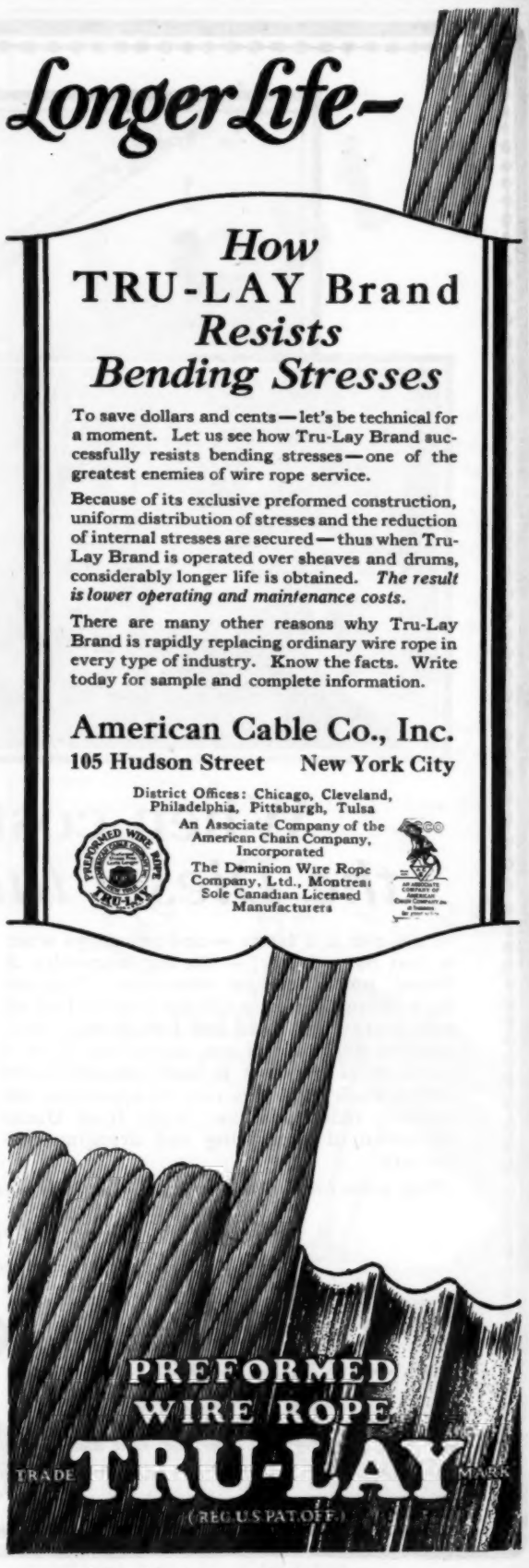
Southern California and Arizona

Southern California

BY J. H. SACKETT

Contract has been awarded to H. W. Rohl, 727 West 7th Street, Los Angeles, who bid $395,387 for the construction of concrete storm drains, reinforced concrete pipe system in the Laurel Canyon storm drain system for the City of Los Angeles.

Contract awarded by the Board of Supervisors of Orange County to Western Construction Co., 144 North Larchmont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How
TRU-LAY Brand
Resists
Bending Stresses
To save dollars and cents—let's be technical for a moment. Let us see how Tru-Lay Brand successfully resists bending stresses—one of the greatest enemies of wire rope service.
Because of its exclusive preformed construction, uniform distribution of stresses and the reduction of internal stresses are secured—thus when Tru-Lay Brand is operated over sheaves and drums, considerably longer life is obtained. The result is lower operating and maintenance costs.
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WIRE ROPE
TRADE TRU-LAY MARK
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In writing to American Cable Company, Inc., please use post card bound in the center of this number.

SHOTS FROM THE FIRING LINE — Continued

Boulevard, Los Angeles, who bid $64,633 for constructing reinforced concrete bridge over the San Juan Creek on the State Highway.

Contract has been awarded to Will F. Peck Company, 1120 Las Palmas, Los Angeles, who bid $135,932 for the improvement of Mulholland Street, between Osborne and Clybourn Avenues.

Bids will be received up to July 19th by United States Department of Interior, Indian Field Service, San Carlos, for 213,000 barrels of Portland cement for Coolidge Dam Project.

The Los Angeles County Flood Control District, 202 North Broadway, Los Angeles, recently took bids for the furnishing of 2,600,000 barrels of cement and 3,250,000 tons of sand and gravel for use in connection with the San Gabriel Dam Project.

Contract has been awarded to Ben Pearce, Commonwealth Building, San Diego, who bid $184,819 for the improvement of National Avenue for the City of San Diego. Struve & Nunn and the Pioneer Transfer Company, both of San Diego, were the last two lowest bidders on this job.

A contract was recently awarded to Thomas Kelly & Sons, Hillstreet Building, Los Angeles, by the Los Angeles County Sanitation District No. 2 for the construction of a portion of Joint Out Fall Units No. 6 and No. 7. The above contractor's bid on this job was $167,011.

Contract was also awarded by the District to C. E. Green, Western Mutual Life Building, Los Angeles, for the construction of Units No. 4 and No. 6 of the Joint Out Fall Sewer System. Mr. Green's bid was $223,745.

A remarkable new backfiller

This new automotive backfiller, operated by the dependable Allison Hoist, is so simple that two men can operate the whole outfit. Little wear on cable, goes anywhere under own power. Lightest, strongest Mormon board made included as standard equipment. Cut your backfilling costs. Write for literature.

Allison WILLAMETTE HOIST FOR THE FORDSON

Allison-Fordson backfiller

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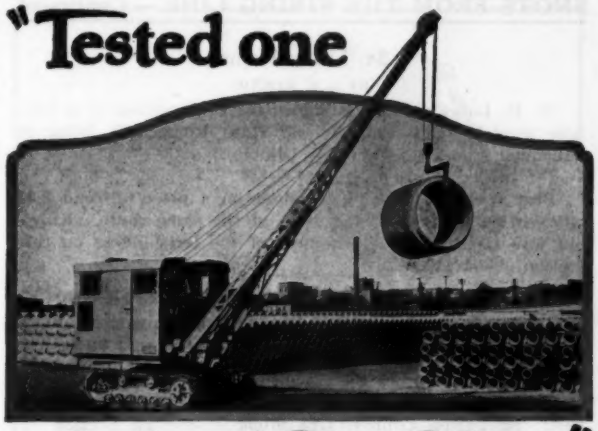
Dealers Everywhere

Willamette automotive hoists

ALLISON FOR THE FORDSON ~ WILLAMETTE FOR THE CATERPILLAR

"Tested one



~Ordered Two More"

Repeat orders consistently form a large percentage of Buckeye business.

Zimmermann & Zimmermann, Milwaukee Contractors, recently bought a Buckeye Utility Backfiller-Crane, subject to its meeting their rigid standards of performance.

Upon its arrival, here's how they proved it — in the actual words of the representative —

"By picking up a big steam duplex pump weighing about 6000 lbs. — the crane handled it at a 20-foot radius. To further test the machine, they lowered the boom and propelled the crane with the load into a shed where the doorway was only about 10 feet high. This meant handling a 6000-lb. load at approximately 26-foot radius.

"The crane handled it so easily that they *ordered two more the same day.*"

The Utility Backfiller-Crane costs little more than an ordinary backfiller, but it has a far greater service range. It is profitable for trenching, backfilling, pulling sheeting, loading and unloading pipe, handling batch boxes, stone, steel, and miscellaneous materials.

Ask for illustrative and descriptive bulletin.

Prompt Shipment

***The* Buckeye Traction Ditcher Company ~ Findlay, Ohio**

There's a Buckeye Sales and Service Office near You

Buckeye FOR OVER 30 YEARS

SHOTS FROM THE FIRING LINE — Continued

St. Louis Items

BY A. B. KOENIG

W. D. Lonergan is low bidder for construction of a 5.02-mile stretch of Section 105 of State Route 125, lying in Sangamon and Cass Counties, Illinois.

Bert L. King is the low bidder on a piece of road 3.31 miles in length, comprising 106A of the same route. King's bid was $25,628.50. The highest of the ten bidders on this section asked $44,197.

A low bid of $10,307.40 was entered for the construction of a bridge in Section 106B of Route 125 in Sangamon County by G. C. Fairclo.

Low bids for other Sangamon and Central Illinois Counties, with the length of road, route and section numbers follow: Sangamon County, 1.75 miles, Route 24, Section 12, Sangamon Construction Co., $35,308; Greene County, 1.49 miles, Route 3, Sections 62 and 62X, Folgelman & Davison, $33,664; Pike and Scott Counties, 5.36 miles, Route 36, Section 20A, C. I. Jones, $104,914; Morgan County, bridge structure, McCalmon Company, $13,926; Morgan County, bridge structure, Gurtgen and Sayer, $5,020.

E. Berns & Co. were awarded contract for a stretch of hard road on Route 121 southeast of Decatur, Illinois.

Harrelson & Johnson were awarded grading on Route 154, Section 108A, Perry County, Illinois.

Durron & Barron were awarded paving contract on Route 59, Section 106W, Lake County, Illinois.

W. C. Johnson was awarded bridge contract on Route 121, southwest of Decatur, Illinois.

The Moore Construction Co. of East St. Louis was awarded two paving projects: the paving of Forty-fourth Street from Caseyville Avenue to Lincoln Avenue, and Kansas Avenue from Fifteenth to Sixteenth Streets, in East St. Louis, Illinois. Their bid for the work was $22,961.

The Louis Rich Construction Co., also of East St. Louis, was awarded the paving of Forty-seventh Street from Caseyville Avenue to Lincoln Avenue, the paving of Eighteenth Street from Lake Avenue to Natalie Avenue and Exchange Street from Fifteenth Street to Seventeenth Street. Their bid was $32,200.

Bids for the construction of the hydro-electric power dam of the Black River Hydro-Electric Co., 30 miles north of Poplar Bluff, Missouri, will be opened June 28, at the offices of the New York Bankers handling the work, according to W. H. Meredith, vice-president of the company of Poplar Bluff. The power project is expected to cost nearly $4,000,000.

Geo. D. Nichols & Son was awarded contract to construct one and four-tenths miles of concrete road from Hot Springs, Arkansas, city limits to the County Club on the Hot Springs-Malvern Road. Their bid was $47,723.85.

The Madison Construction Co. were awarded a couple of highway jobs in Madison County, Illinois.

The Humes-Deal Construction Co. were awarded contract for the walls, reinforced floors and exterior terra cotta finishings of the new Missouri Pacific Railroad building at 13th and Olive Streets here. It is expected the new building will be entirely completed by May 1st, 1928. The proposed new structure will be a 22-story office building, and will house the headquarters of the Missouri Pacific Railroad Co.

YOU SELECT your equipment for its adaptability to your work.

For its power — speed — durability — rugged strength — efficiency.

Do not all of these depend upon the boiler?

Can you afford to consider anything less than the very best?

DO YOU LOOK FOR

JOHNSTON BROS., Inc.

Specializing in Boilers for Contractors' Equipment

FERRYSBURG, MICHIGAN

SHOTS FROM THE FIRING LINE — Continued

The Locher Construction Co. were awarded a grading and paving job in Bentonville, Arkansas.

The Mobley Construction Co. were awarded contract for paving 42 blocks in Dardenelle, Arkansas. Reinforced concrete is being used.

Hopper & Son started on their grading and paving work in Petersburg, Illinois.

William S. Dawley, a noted civil engineer who planned many of the railroads in this part of the country, died May 23rd at the age of 70. Dawley was a member of the American Society of Civil Engineers, the Western Society of Engineers, the Engineer's Club of St. Louis, the St. Louis Railway Club and the Circle Club. He was also a charter member of the American Railway Engineering Association. He is survived by his widow, Mrs. Angie Havens Dawley and a daughter, Miss Helen Dawley.

The Byrne Construction Co. of Chicago are low bidders for the construction of the seawall at Beardstown, Illinois. Their bid was $338,832.00.

B. F. Brooks of the B. F. Brooks Construction Co. says they will finish their highway job near Belle, Missouri, in 40 days if the rain ever lets up.

Winston Bros. Co. moved their offices here from Rooms 222-224 to 422-424 in the Buder Building, 7th and Market Streets. W. J. Rohan is in charge, assisted by Ed Bernard and Ed Graham.

Jones & Jordan have a job of bank widening on the Missouri Pacific Railroad opposite Memphis, Tennessee, and are doing this with station men.

THE strength and correctness of design of Hayward Buckets is emphasized by loads such as this.

In any soil formation an over capacity load is common because Haywards are fitted to the job. This does not mean a special bucket because the Hayward line is complete.

Let us show you what Haywards can do for you.

THE HAYWARD COMPANY
52-54 Church St. New York

Builders of Buckets — Clam Shell, Orange Peel, Drag Line, Electric Motor.

Machinery — Dredging, Excavating, Coal Handling, Counterweight Drums, Automatic Take-Up Reels.

Hayward Buckets

TWIN CITY ENGINES

"Built to do the work"

Bucyrus 20-B Shovel with Twin City Engine on highway work in Washington, United Construction Co.

Other TWIN CITY users include Austin Machinery Co., Baldwin Locomotive Works, Buckeye Traction Ditcher Co., Cement Gun Contracting Co., Northwest Engineering Co., Pennsylvania Pump and Compressor Co., Sargent Tile Ditcher Co., Star Drilling Machine Co., Washington Iron Works, Willamette Iron & Steel Works, etc. Twin City Engines are made in sizes 35 to 140 h.p. Write for Literature.

MINNEAPOLIS STEEL AND MACHINERY CO., Minneapolis, Minn. *Heavy Duty Engine Manufacturers Since 1903*

SHOTS FROM THE FIRING LINE — Continued

The Missouri Pacific Railroad rented in the neighborhood of 100 standard gauge dump cars from John Marsch, Inc., Chicago. They have these working on flood protection work on the Missouri River near Myrick, Missouri. Winston Bros. Co. are loading the material with one of their big shovels.

A. T. McFarlane of the Interstate Company, Kansas City, Missouri, was in town looking up boarding contracts.

Jim Winston attended a party one evening a little distance from camp on the Missouri Pacific Railroad. It started to rain, yes it poured, and when Jim got ready to return to camp he found himself and his automobile marooned on an island. The Gasconade River had raised and was all over the country. Jim got back to camp next day in a boat. In the future he is going to carry a trailer with a boat when attending parties along the Gasconade River.

Yale & Reagan opened an office in Room 819, Laclede Building, St. Louis. L. P. Yale is moving his family from Chicago, and in the future will make St. Louis his home. This firm has a standard gauge, also a narrow gauge, shovel outfit idle which they can place on work immediately.

Eugene Keller, Box 53, Louisiana, Missouri, has eight dump trucks and wants gravel hauling or anything to keep them busy.

Luke O'Brien of Cook & O'Brien, Kansas City, was with us a day, looking over things in this neighborhood. This firm has a job on the Santa Fe Railroad in Northern Illinois.

The Gould Construction Co. want to rent a caterpillar crane to unload material on their job on the Pennsylvania Railroad at Collinsville, Illinois.

Jas. McCann wants a job for a 25-team outfit. 4518 Laclede Avenue or 702 Times Building, St. Louis, will catch him.

The O. B. Avery Co. moved their office and warehouse from 1442 North Broadway to a larger and more convenient place at 1325 South Macklind Avenue, St. Louis. Their new phone number is Highland 1810.

A. J. Paler, bookkeeper of the Walsh Construction Co., on their sewerage disposal job at Akron, Ohio, spent a day with us. Everything is going nicely at Akron.

Frank McCaughey of J. J. McCaughey Co. is sticking close to their Pennsylvania Railroad work across the river here. They made a good start and are keeping it up.

M. L. Windham finished his steam shovel work on the Wabash Railroad at Decatur, Illinois, and wants a job for their standard gauge outfit.

J. L. Simmons Construction Co., La Plata, Missouri, have 40,000 yards of wheeler and fresno work on state highway in Illinois to sublet.

Contractors when in want of work or labor for their outfits write, wire or phone Koenig Labor Agencies, 612 Walnut Street, St. Louis, Missouri, or 501 Delaware Street, Kansas City, Missouri.

Jim Gould subbed a piece of Santa Fe Railroad work in Illinois from Cook & O'Brien, and moved a team outfit from Kansas City on to it.

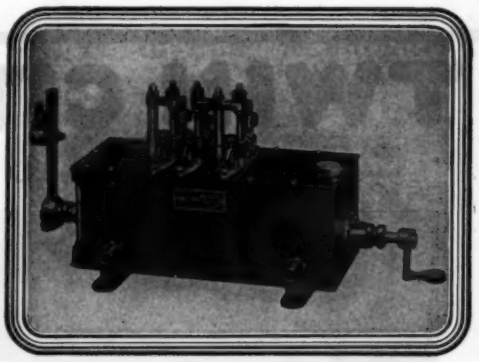
John Marsch came in from Chicago. He left a bunch of club house tickets for the Derby at Fairmount Park with the boys in our office which were very much appreciated and enjoyed by them. We didn't hear how Marsch came away from the derby, but we hope he was on Buddy Bower, the winner.

A McCord Force Feed Lubricator Will Keep Your Shovel on the Job

A McCord force feed lubricator installed on your steam shovel now will insure more continuous operation. Dependable force feed lubrication prevents shutdowns and delays, it gives more hours on the job.

McCord force feed lubricators are used as standard equipment by the largest and best-known steam shovel builders and they will be installed on any shovel at your request.

Put a McCord lubricator on now and be assured of dependable lubrication for the life of your shovel.



McCord Class B. A. Force Feed Lubricator

McCord Radiator & Mfg. Co.
Detroit, Michigan

McCord
force feed
Lubricators

SHOTS FROM THE FIRING LINE — Continued

Canada

Montreal and Vicinity

BY J. M. WARD

We had a visit this week from Wm. Cooke of the Cooke Construction Company, who are building 31 miles of Canadian National Railroad from St. Felicien to Mistassini. Mr. Cooke tells us that the work is progressing very satisfactorily.

Carniel & Rossi have been awarded contract for about 30,000 yards of excavation for the By-Products Coke Co. These people also have a sub-contract for two miles of rock work on the Canadian Pacific Railroad near Chapleau.

Tenders for the Grand-Mere-Burrills Section of Canadian National Railroad have not as yet come out, but contractors are waiting from day to day. This is an eight-mile job and estimated to cost $1,600,000.

Angus & Taylor of North Bay have been awarded contract by the Toronto & Northern Ontario Railway for the extension of the Nipissing Central Railroad into Rouyn.

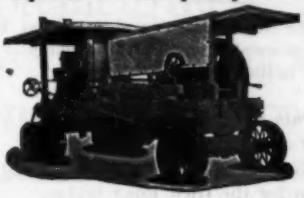
McDougal Bros. of Ottawa have taken a sub-contract from Angus & Taylor on the Nipissing-Central for 40,000 yards of excavation, and also for loading ballast.

The Anticosti Corporation had a big program laid out for this year at Anticosti Island, consisting of a railway, pulp mills, etc., but we understand it has been postponed until 1928.

The Ontario Paper Co. recently asked for bids for $150,000 extension on their work at Shelter Bay, but headquarters at Chicago have turned down this appropriation for this year.

Clipper Drills Are Always Dependable Regardless of Season or Weather Conditions

If the drill breaks down, or must be closed down, blasting operations are stopped and the output of the quarry is lessened; hence a simple, rugged and CONSTANT PRODUCTION DRILL is required for the quarry.



The new type LOOMIS "CLIPPER" BLAST HOLE DRILL meets these demands—"some of the reasons" it predominates.

Write us for information.

THE LOOMIS MACHINE CO.
(Established 1842) K Street, Tiffin, Ohio

Have one on me?

That's the Spirit Behind Gatke Products

Try our Brake Blocks or our Friction Blocks on your draglines, your shovels or any of your hoisting equipment—the harder the service, the better.

—Compare their cost and service with wood blocks or other compositions.

—You'll find them the BEST AS WELL AS THE CHEAPEST. EVERY INSTALLATION IS GUARANTEED.

It is not Asbesgraphite unless it is marked "GATKE"

THOMAS L. GATKE
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BRAKE and FRICTION BLOCKS for Marion, Monighan, Bucyrus, Osgood, Thew, Page, etc.

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For every type of Hoisting Equipment, including Lidgerwood, Mundy, Mead-Morrison, Flory, National, Orr & Sembower, Clyde, American, Lambert, Thomas, and others.

We also manufacture "EKTAG"—the Gatke Hydraulic Compressed Asbestos Brake Lining, in any width or thickness

SHOTS FROM THE FIRING LINE — Continued

H. F. McLean, Limited, who have a contract for the extension of the Toronto & Northern Ontario Railway, have opened an office at Island Falls, Ontario.

The Province of Quebec, Department of Highways, have quite an extensive program laid out for this year, for the building of new gravel roads, oiling and maintenance. Several contracts have already been awarded, and tenders called for additional sections. Excessive rains and cold weather have caused main highways to be in shape very much later this season, and considerable work has been held up on account of wet weather.

It is expected that the new power development at Back River, Montreal, will be proceeded with without delay. This job will run into several million dollars.

Toronto and Vicinity

BY C. F. ENGLAND

The Nelson River Construction, Limited, have contract from the City of Toronto for the Glen Road bridge.

W. R. Worthington Construction Co., Limited, have contract from the City of Toronto for sewer work at Queens Quay.

Richardson & Mason have started contract for Canadian National Railways, Fleet Street retaining wall and subway.

H. Cope & Son have contract for sewer work in Town of Port Hope.

TRADE NOTES

As a guide to competitors in the Lincoln Arc Welding Prize for 1927, consisting of $17,500, given by the *Lincoln Electric Company of Cleveland, Ohio*, and administered by The American Society of Mechanical Engineers, 29 West 39th Street, New York City, the donors issued a pamphlet of suggestion, which may be obtained upon application. The winners of the Lincoln Arc Welding Prize for 1927 will be largely selected on the basis of the amount of economic saving that the suggestion submitted shows either directly on the design submitted or in its possible wider application. All suggestions should be made with that in mind. The Lincoln Electric Company stands ready to assist anyone by suggestions or data upon receipt, and further information can be secured from either The Lincoln Electric Company or from the American Society of Mechanical Engineers.

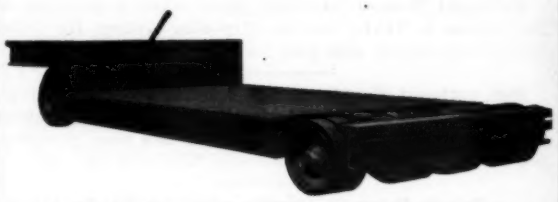
BOOK REVIEWS

We shall be glad to review such books and catalogs as are sent us

WORM GEARS AND DRIVES — 8 x 10½, 32 pages with cover, well illustrated. This bulletin recently published describes a new line of Fawcus Worm Gear Drives manufactured by the Fawcus Machine Company. Copy may be obtained by writing to the *Fawcus Machine Company, Pittsburgh, Pennsylvania.*

6-Wheel Contractor's Trailer

For Hauling Steam Shovels and Other Heavy Equipment



Showing Clear Space for Loading Over Rear End

This Trailer has a carrying capacity of 30 tons and can be loaded over the rear end as well as from either side. It is equipped with rubber tires, Timken bearings, and internal expansion brakes.

There are two wheels in front and four in the rear. It can be turned in its own length and a 5-ton truck will haul it with a 30-ton load.

Ask for bulletin showing Trailers of 20 tons and 50 tons capacity.

BUCYRUS COMPANY

SPECIALTY DEPARTMENT

South Milwaukee, Wisconsin, U. S. A.

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WHY WE WILL NOT CHEAPEN HERCULES DETONATORS

There are detonating compounds in use which are cheaper than the fulminate-chlorate composition which is in all Hercules Blasting Caps and Electric Blasting Caps. But the detonator is so important to the successful use of explosives that the Hercules Powder Company will not consider cheaper ingredients until something is discovered which is actually as good and as certain under all conditions. The cost of a cap is too small an item in the total cost of blasting to make it worth while to take chances by cheapening it.

For the same reason, only platinum is used for the bridge wires in Hercules Electric Blasting Caps—broken bridges are practically unknown.

You pay no more for Hercules Detonators but you receive greater value.

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DENVER	LOS ANGELES	PITTSBURGH	WILMINGTON, DEL.

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☐ Please send me your new booklet describing the advantages of Hercules Electric Blasting Caps.
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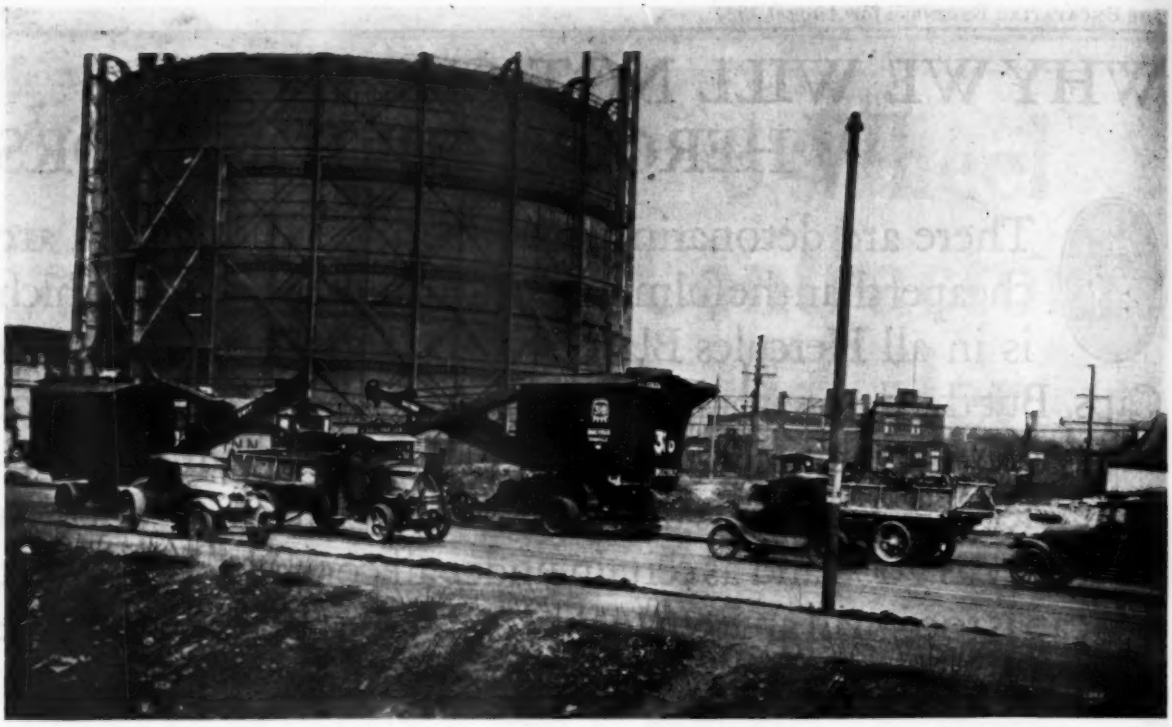

Going Onto the Job.

Looking Out Over the Booms of the Shovels Toward the City.